

MGT 3743 – Fall 2016
Analysis of Emerging Technologies
Tuesday / Thursday 9:35 to 10:55
Scheller College of Business Room 221

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Emerging technologies can change the business and societal environment rapidly and dramatically. The ability to analyze emerging technologies and to forecast their implications for individuals, businesses, markets, and society is a critical skill in a broad range of contexts, including:

- Managers considering the use of an emerging technology within their organizations,
- Analysts predicting the impact of an emerging technology on an industry,
- Inventors or entrepreneurs developing a new technology,
- Policy makers charged with helping society benefit from emerging technologies.

This course introduces students to methods for analyzing and making decisions about emerging technologies. This includes tools, principles, and theories for evaluating which technologies will emerge and why. Given this understanding, students should be able to develop useful technology forecasts and leverage those forecasts for business advantage.

COURSE STRUCTURE

Most course sessions are two-pronged.

- a) First, we will discuss an emerging technology, such as renewable energy, crypto-currencies, drones, electric/hydrogen cars, DNA editing, etc. We will consider the implications of the technology for business and society. In this way, the course is a survey of emerging technologies.
- b) Second, and perhaps more importantly, we will use each technology as a "case" to explore a deeper principle related to the emergence of new technologies. This will give us a framework for making predictions about which technologies will emerge and which will not, including what we can do about it and how we can profit from it as managers. We will discuss methods of scanning the horizon for emerging technologies (i.e., methods for forecasting and invention) and the principles that govern whether a new technology is adopted or not (e.g., technology adoption theory, standards, network effects, legal / normative forces, stakeholder impact, etc.)

COURSE OBJECTIVES

After taking this course, students should be able to:

- 1) Describe, compare, and contrast forecasting methods, including the purpose of each method, how each method is conducted, what the output of each method is, and each method's strengths and weaknesses.
- 2) Develop a cone of uncertainty to depict a forecast / predictions in a visual manner.
- 3) Describe and provide examples of the principles of effective forecasting. Apply these principles to develop credible forecasts and be more critical of forecasts developed by others.
- 4) Present and critique arguments for and against the prospect that artificial intelligence / robots will harm society by displacing work previously done by humans.

- 5) Describe how to use business experiments to evaluate policies and develop forecasts. Apply the basic steps of experimental design to design and conduct your own business experiments.
- 6) Describe the history, purpose, and tools of the Theory of Inventive Problem Solving (i.e., TRIZ) and apply them to solve technical problems.
- 7) Apply the 5 factors of innovation diffusion to analyze the potential diffusion of a new technology, including what factors stimulate diffusion, what factors do not, and why.
- 8) Describe the relationship between the S-curve of technology diffusion and the classification of adopter categories (i.e., innovators, early adopters, etc.)
- 9) Define and provide examples of a technology platform, a multi-sided platform, and the “sides” of a platform.
- 10) Describe the role of network effects in the success (or failure) of technology platforms, including defining, comparing, and contrasting cross-side and same-side network effects.
- 11) Apply strategies to increase the likelihood of success for platforms in which you have a stake. Apply the theories and principles re: technology platforms to predict which platforms will succeed, which will fail, and why.
- 12) Identify possible outcomes of platform competition, including factors that influence the likelihood of each outcome.
- 13) Discuss the pros and cons of joining a platform, including the potential benefits of reach, the potential consequences of holdup, and the potential benefits of establishing a single industry standard.
- 14) Apply strategies for maximizing the benefits of a platform’s reach while mitigating the risk of holdup.
- 15) Apply the principles of network effects, platform competition, reach, and holdup to different contexts, including but not limited to contactless payments, smartphones, digital music, and high-definition home video.
- 16) Describe the “chicken and egg” infrastructure problem for emerging technologies, along with classes of solutions.
- 17) Apply “chicken and egg” solutions to infrastructure problems in different contexts, including but not limited to new payment methods and alternatively-fueled vehicles.
- 18) Describe, compare, and contrast different methods for establishing technology standards.
- 19) Discuss the current and historical role of technology standards in home entertainment, “smart” homes, user authentication, and other technologies.
- 20) Discuss the pros and cons of technology standards from the perspectives of the developer of the standard and users of the standard.
- 21) Present and provide examples of possible strategies when a single standard is unlikely to emerge.
- 22) Compare and contrast a modular system to a monolithic system, including the advantages and disadvantages of modularity.
- 23) Use stakeholder analysis tools to gauge which of several competing technologies enjoys the most advantageous stakeholder support.
- 24) Discuss the effect of stakeholders’ influence on the emergence of new technologies such as the development of the electric vehicle in the 1990’s and air travel and FM radio in the mid-20th century.
- 25) Describe and provide examples of how laws and regulatory policy can foster or hinder emerging technologies.
- 26) Discuss the inherent tension between innovation and regulation and provide examples related to the “sharing economy”.
- 27) Determine whether an industry and/or company is vulnerable to “spontaneous deregulation” and if so, discuss and apply appropriate strategies.

- 28) Describe the infrastructure overprovisioning problem that characterizes electricity production and highway use.
- 29) Describe general solutions for solving the infrastructure overprovisioning problem and apply them in different contexts.
- 30) Describe and provide examples of how new technologies can reveal otherwise hidden information that may lead to potential discrimination and create adverse selection considerations.
- 31) Apply information revelation and adverse selection principles to analyze the potential impact of DNA testing and other technologies that reveal otherwise hidden information.
- 32) Discuss the role of social norms and ethics in the emergence of new technologies, including how technologies that are successful in certain cultures are frowned upon or disallowed in other cultures.
- 33) Analyze the ethical considerations associated with an emerging technology by assessing the different components of the meaning of ethics.
- 34) Discuss issues with traditional gasoline vehicles, along with issues and opportunities associated with alternative fuel vehicles.
- 35) Discuss issues with fossil fuel-based methods of electricity production, along with issues and opportunities associated with “clean” alternatives.
- 36) Present the argument for why fossil fuel combustion is linked to global warming and discuss regulatory and technological options for reducing emissions associated with fossil fuel use.
- 37) Describe the current state and future prospects of emerging technologies such as private space exploration, airborne and underwater internet infrastructure, crypto-currencies and blockchain systems, contactless payments, machine learning, “smart” homes, human augmentation, wearable technology, biometric authentication, olfactory interface technologies, DNA sequencing and editing, alternative energy, alternative fuel vehicles, and autonomous vehicles (including drones).

GRADING

- Emerging Technology Briefing – 10%
- Report from the Future – 15%
- Presentation of Emerging Technology Briefing or Report from the Future – 3%
- Mid-Term Exam – 22%
- Final Exam – 22%
- Homework Assignments – 8%
- Quizzes – 10%
- Class Attendance and Participation – 10%

Your final grade will be assigned as a letter grade according to the following scale:

A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	0-59%

Emerging Technology Briefing

This is a group assignment. Each group will prepare a 3 to 4 page (single-spaced) briefing document on an emerging technology of their choice.¹ Given the space limitations, choose a topic that is well-defined

¹ If the group is presenting in conjunction with a visit from a corporate partner, then the topic will be assigned to the group and the instructions will vary slightly (I will provide the topic and updated instructions).

and relatively narrow in scope. For example, do not choose “artificial intelligence”; instead, choose “autonomous vehicles” or “movie recommendation systems”, both of which are specific applications of artificial intelligence. Sources I recommend for potential topics include *Technology Review*, the Technology section of the *New York Times*, and *Wired*. The briefing document should contain the following sections:

1. Explanation of the emerging technology. Explain the technology on which you are focusing, including a brief history of the technology and its current status. Recommended length: 0.5 to 1 page.
2. Predictions. Include *specific* predictions for what will happen with this technology in the future over the near-term, medium-term, and long-term. This section should be structured as follows. Recommended length: 1.5 to 2 pages.
 - Develop a “cone of uncertainty” to depict the time horizon of each prediction and your level of certainty. We will discuss the “cone of uncertainty” in detail in one of our first sessions. **Include a graphic depicting the cone of uncertainty**, and then elaborate on the **3 most interesting** predictions, including one prediction for the near-term, medium-term, and long-term. Include justification for each prediction. Specifically,
 - State why you believe the prediction will occur in the expected time frame,
 - State your level of certainty in the prediction, and
 - Describe what factors might cause the prediction to be inaccurate. E.g., what roadblocks exist that affect your level of certainty?
3. Implications for stakeholders: Consider the key stakeholders that are impacted by this technology; this will include both existing players and new entrants (i.e., entrepreneurs). Assume that your predictions turn out to be right, and describe the implications for the stakeholders. This section should be structured as follows. Recommended length: 1 page.
 - List the **2** most affected stakeholders and discuss the following for each:
 - How will the stakeholder be affected? What opportunities/threats does the emerging technology create for the stakeholder?
 - How should the stakeholder respond?

A 2-3 sentence statement of the emerging technology that you will analyze is due on or before **September 13**. In this, clearly state the emerging technology on which you will focus. The final briefing is due on **October 4**. **All** groups will prepare an emerging technology briefing, and **half** of the groups will present the analysis contained within their briefings to the class. (Other groups will present the analysis contained within their Report from the Future; see below.) Students who want to present their briefing document will sign-up for a presentation date using T-Square. Please note that it is possible that your group will present your briefing document after October 4, even though the briefing itself is due on Oct. 4.

When you turn in your briefing, each group member must also complete a peer evaluation form. *No one from the group will receive credit for the assignment until all group members complete the peer evaluation.*

I will award points for each component of the briefing document based on that component’s quality. Points available for each component are as follows.

Introduction and cone of uncertainty	0-2 points
Prediction #1	0-1.5 points
Prediction #2	0-1.5 points

Prediction #3	0-1.5 points
Implications for Stakeholder #1	0-1 points
Implications for Stakeholder #2	0-1 points
Overall clarity, flow, formatting, etc.	0-1.5 points
TOTAL	0-10 points

I will sum the scores for each component to yield the group grade, which is different from each student's grade. Each student's grade will be determined as discussed below in the "Individual Student Grades for the Emerging Technology Briefing and Report from the Future" section.

Students often make the following mistakes in the briefing document:

1. They deviate from the assignment instructions by not following the structure defined above. For example, they mention every prediction they developed, rather than focusing on their 3 most interesting predictions and going into depth on those. Or, they allocate too much space to Section 1 and leave little room for the predictions and stakeholder analysis sections. Or, they fail to justify their predictions as described above.
2. They choose a topic that is too broad. As a result, the briefing document is too wide-ranging and does not offer interesting insights in any particular area.
3. They do not exert quality control over the entire document. E.g., one group member writes a high-quality predictions section (receiving 4.5 out of 4.5 points for this section), but another group member writes a low-quality introduction and stakeholder implications section (receiving 0.5 out of 4 points for this section).
4. They "free-load" by not contributing to the group. As a result, their grade is lower than the group grade.

Report from the Future

This is a group assignment. You are to **pretend that the year is 2026** and that you are looking back on the preceding 30 years (i.e., 1996-2026). The project is to write a brief history (10 – 12 double-spaced pages) of a business or societal process. By "process," I mean a set of steps to achieve some objective. For example, you might study the process of going to the doctor for a routine physical examination. You are to present this as a narrative of how the process evolved over time, providing specific examples of developments not only in the 1996-2016 period but also in the 2016-2026 period. You are to present this as a retrospective; given that you are pretending it is 2026, you will "know" everything that happened from 2016-2026. Given space limitations, do not choose a process that is overly broad. For example, instead of studying the process of shopping, study the process of shopping for a specific good (e.g., a car, a house, clothes.)

The report should consist of 2 sections:

1. The first section will state the process on which your group has chosen to focus and review how the process evolved between 1996 and 2016. Be specific here; describe the key developments that changed how the process was conducted during this period (this will require some research). Recommended length: 4-5 pages.
2. The second section of the report will discuss how the process evolved between 2016 and 2026. State the logical reasoning behind your analysis, including principles we cover in the course (as appropriate). For example, did legal and normative forces create changes in the process, were new standards and/or platforms developed, etc. Use your analysis from section 1 to identify the trends that developed from 1996 to 2016 that continued into this period (and also to gauge how quickly your process tends to evolve). Be specific in this section: describe how and why the process evolved, not merely that it evolved. Include specific "historical" occurrences from this period and describe

why these things happened. For example, instead of stating that “5% of cars were self-driving by 2026”, state that “5% of cars were self-driving by 2026, with the majority of these in Nevada, where legal precedent was set as early as 2010, and in New York, which converted 50% of the NYC taxi fleet to self-driving cars in 2023 (after negotiations with the New York Taxi Workers Alliance broke down.)” In other words, don’t simply state the outcome; think deeply about how that outcome came to be – including issues and stumbling blocks that delayed the outcome – and describe that in your report. Also, which companies flourished during this period and why? What start-ups were founded, and which incumbents were harmed? Be specific here. The report is retrospective, so you will “know” which companies did well and which did not. Your analysis must be credible, so you must provide enough detail to explain why things happened in the time frame that you are providing.

Recommended length: 6-7 pages.

The report must contain each of these sections, along with a list of works cited in your analysis. **Think about how the report flows and use headings and sub-headings to improve readability and flow.**

A one paragraph statement of the process that you will analyze is due on or before **October 25**. This paragraph should include the process on which you have chosen to focus, the objective of that process, and at least two steps involved in that process. On **November 3**, you will turn in a high-level summary of 3 key developments (providing 2-3 sentences per development) in the 2016-2026 period. The report is due on **November 22**. **All** groups will complete the Report from the Future assignment, and **half** of the groups will present the analysis contained within their Reports from the Future to the class. (The other half of the groups will present the analysis contained within their emerging technology briefings; see above.) Students who want to present their Report from the Future will sign-up for a presentation date using T-Square. When you turn in your Report from the Future, each group member must also turn in a peer evaluation form. *No one from the group will receive credit for the assignment until all group members complete the peer evaluation.*

I will award points for each component of the Report from the Future based on that component’s quality. Points available for each component are as follows.

Section 1	0-5.5 points
Section 2	0-7.5 points
Overall clarity, flow, formatting, etc.	0-2 points
TOTAL	0-15 points

I will sum the scores for each component to yield the group grade, which is different from each student’s grade. Each student’s grade will be determined as discussed below in the “Individual Student Grades for the Emerging Technology Briefing and Report from the Future” section.

Students often make the following mistakes in the Report from the Future:

1. They deviate from the assignment instructions.
2. They don’t analyze a process. When considering a potential topic, if you cannot identify the objective of the process or list the steps involved in achieving that objective, then you are not analyzing a process, and you need a new topic.
3. They choose a process that is too broad.
4. Related, they put too many ideas into the report and consequently do not develop any of them in sufficient depth. It is better to include a lower number of well-developed and specific ideas than to include a lot of ideas that are under-developed and lack depth.

5. They describe developments in the 2016-2026 period that are not credible, and they do not provide enough detail for them to be credible. E.g., they describe companies adopting strategies that are completely foreign to them, without justifying why these companies made such a dramatic shift. Or, they describe government policies that run counter to years of established policy, without explaining these shifts.
6. They do not coordinate with each other on the project. The result is a poorly integrated collection of ideas that lacks coherence, and there is no quality control exerted over the final product.
7. They “free-load”.

Group Composition

Groups should consist of **4 to 5** people.

- Each student will have one group (“first group”) for the first part of the semester. This will be your group for completing the emerging technology briefing. Each student will turn in his/her first group affiliation as a graded homework assignment on **September 1**. If your group signs up to present your emerging technology briefing, then your group will belong to pool A. Otherwise, your group will belong to pool B.
- Each student will have a different group (“second group”) for the second part of the semester. This will be your group for completing the Report from the Future. If your first group belonged to pool A, then you will form your second group from other students who were also in pool A. (Ditto for pool B.) *No more than 2 members of any first group may be in the same second group.* Each student will turn in his/her second group affiliation as a graded homework assignment on **October 13**.

Individual Student Grades for the Emerging Technology Briefing and Report from the Future

For the Emerging Technology Briefing and Report from the Future assignments, each group will receive a group grade as noted above. Each student’s grade will be determined as follows: *Student Grade = Group Grade + Student Adjustment Factor*, with the *Student Adjustment Factor* based on peer evaluations.

- If your average peer evaluation is 3 or higher, then your Student Adjustment Factor will be 0 or positive. It will be positive if your average rating is substantially higher than the average for your teammates, according to this schedule.

Difference in your peer evaluation rating and the average of those of your team	Adjustment Factor	
	Emerging Technology Briefing	Report from the Future
1 or more points higher	+1	+1.5
0.5 to 1 points higher	+0.5	+0.75

- If your average peer evaluation rating is below 3, then your Student Adjustment Factor will be negative, according to this schedule.

Average Rating	Adjustment Factor	
	Emerging Technology Briefing	Report from the Future
2.5 to 3	-1	-1.5
2 to 2.49	-2	-3
1.5 to 1.99	-4	-6
1.0 to 1.49	-8	-12
1.0	-10	-15

I reserve the right to revise the Student Adjustment Factors if I have evidence that the system is being “gamed”.

Presentation of the Emerging Technology Briefing or Report from the Future

Each group will present the analysis contained within either their emerging technology briefing or Report from the Future to the class. The presentation should last 25 minutes, with 15-20 minutes devoted to the formal presentation and the remaining 5-10 minutes devoted to questions and answers. The structure of the presentation and the time allotted to each section should mirror the briefing document or Report from the Future, whichever is applicable. Audio/video materials (e.g., YouTube clips) are often good complements to a presentation. However, these should consume no more than 3-4 minutes.

I will award points for the presentation as follows.

Clarity and flow	0-1 point
Use of audio/video materials	0-1 point
Ability to engage the class	0-1 point
TOTAL	0-3 points

Each member of the group will receive the same grade.

Mid-Term Exam

The mid-term exam is closed book/closed notes and will cover the material up to the date the mid-term is administered. Questions on the mid-term exam will map to the course objectives listed above. The format of the mid-term exam will be discussed prior to the exam.

Final Exam

The final exam is closed book/closed notes and will primarily cover material subsequent to the mid-term, although because the course material is cumulative, some of the materials from the pre mid-term portion of the course will be incorporated into the final exam. Questions on the final exam will map to the course objectives listed above. The format of the final exam will mirror that of the mid-term exam.

Homework Assignments

Throughout the semester, we will have homework assignments. These assignments will have one or both of the following components:

- “Hands-on” exercises to familiarize you with some of the technologies we will explore.
- Questions that prompt you to comment on the issues raised by the readings. The purpose of these assignments is to guide you as you read the assigned articles so that you are prepared for class discussion.

Homework assignments are due at the beginning of the class session for which they are assigned. Late submissions will not be accepted.

Quizzes

Throughout the semester, we will have brief quizzes on the readings. These will be very brief – no more than 3-4 minutes. They will occur at the beginning of class. If you are late to class, you will miss the quiz and receive no credit for the quiz. You are allowed to drop 2 quizzes, which is designed to account for days when you must miss class or are late (and therefore miss the quiz). We will use clickers to conduct the quizzes. It is your responsibility to register your clicker in T-Square and to use it for each quiz. If you do not use your clicker for a quiz, I reserve the right to give you a 0 for that quiz.

If you miss class due to an interview, etc. and miss a quiz, you will receive a 0 for that quiz and should use that as one of your drops. There may be times when missing class is necessary; **this is precisely why** I allow you to drop two quizzes.

* The only exception to this is if you have an institute-approved absence. You are responsible for ensuring that an absence is institute-approved. Some absences are automatically institute-approved (e.g., athletic events). Religious holidays are considered to be institute-approved absences, but you must inform me (in writing) of expected absences for the semester within the first two weeks of class; see <http://catalog.gatech.edu/rules/4/>. In other cases, you must initiate the process to qualify for an institute-approved absence; see <http://www.registrar.gatech.edu/students/formlanding/iaabsences.php> for the policy. You may not request an institute-approved absence retroactively. If you have an institute-approved absence, you may make up a missed quiz. Please consult with me for details.

Class Attendance and Participation

A substantial amount of the value of the course accrues during each session. Your experience and learning will suffer by missing class sessions, even if you are still able to do well on the exams (because the exams do not reflect the totality of the course experience). Given this, it is important to attend the class sessions and to participate in the classroom discussions. It is your responsibility to attend and prepare for each class session, read the assigned articles, and participate in the discussions.

In order to maximize your learning and achieve a good attendance and participation grade, you should:

1. Attend class. I will distribute a sign-in sheet for each session. If you wish to receive credit for attendance, you must sign the sign-in sheet.
2. Be on time. Being late / leaving early will negatively affect your participation grade. *Consistent absences, late arrivals, or early exits can result in a participation grade of 0.*
3. Prepare for class by completing the assigned readings, watching the assigned videos (if applicable), and completing the associated homework assignment (if applicable).
4. Engage with each other and participate in the discussion. Avoid walking in and out of the classroom during class; such behavior will negatively affect your participation grade.
5. Avoid behavior that signals lack of engagement with the class, such as excessive talking with other students, sleeping, etc.

The following illustrates how class participation grades will be assigned (out of 10 points.)

- *10 points*: The student attends class regularly and is well-prepared for each session. The student is a consistent contributor to class discussions, and his/her comments go beyond recitation of facts. The student expresses well thought-out opinions about substantive issues.
- *8-10 points*: The student attends class regularly and frequently participates, but there are times when the student's comments indicate that s/he has not thought deeply about the assigned readings and associated issues.
- *6-8 points*: The student attends class regularly and is engaged, but does not typically participate in the discussion.
- *2-5 points*: The student sometimes is absent, late to arrive, early to leave, or engages in behavior that signals lack of engagement, including walking in and out during class.
- *0-2 points*: The student frequently and/or consistently is absent, late to arrive, early to leave, or engages in behavior that signals lack of engagement, including walking in and out during class.

CLASS POLICIES

Attendance, Late Arrivals, and Early Departures: Due to the nature of the class, attendance is very important. A poor attendance record will negatively affect your class participation grade. Given that the class is taught in Technology Square, you must allow time to travel to and from class. It is not acceptable to be consistently late or leave consistently early because of travel.

Exams: No make-up exams will be given. If you have to miss an exam because of unavoidable circumstances, let me know in advance, and we will work something out.

Academic integrity: Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. For information on Georgia Tech's Academic Honor Code, please visit <http://www.catalog.gatech.edu/policies/honor-code/> or <http://www.catalog.gatech.edu/rules/18/>. Any student suspected of cheating or plagiarizing on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Accommodations for individuals with disabilities: If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (often referred to as ADAPTS) at (404) 894-2563 or <http://disabilityservices.gatech.edu/>, as soon as possible, to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Student-faculty expectations: At Georgia Tech we believe that it is important to continually strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. See <http://www.catalog.gatech.edu/rules/22/> for an articulation of some basic expectations – that you can have of me, and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

Changes to the syllabus: The material within the syllabus is subject to minor changes due to circumstances throughout the semester. In particular, the availability of the guest speakers may cause the schedule to change somewhat. All changes will be announced and distributed in a timely fashion.

Use of electronic devices: All electronic devices (e.g., laptop, tablet, smartphone, etc.) are prohibited during class time unless being used in a class-based activity.

CLASS SCHEDULE

Date	Topic	Readings / Assignments
Aug. 23	Course Introduction	Read the syllabus (required reading!)
Aug. 25	Examples of emerging technologies <i>Featured Technologies:</i> Aerial internet access infrastructure, Mobile phone technology	Read: <ul style="list-style-type: none"> • Project Loon (Simonite, <i>Technology Review</i>, Mar/Apr 2015, pp. 40-45). • What Your Phone Might Do for You Two Years From Now (Tedeschi, <i>New York Times</i>, Nov. 5, 2009).
Aug. 30	Examples of emerging technologies <i>Featured Technologies:</i> Space exploration, data centers, aerial buses	Read: <ul style="list-style-type: none"> • Reusable Rockets (Bergstein, <i>Technology Review</i>, Mar/Apr 2016, pp. 46-47). • Microsoft Plumbs Ocean’s Depths to Test Underwater Data Center (Markoff, <i>New York Times</i>, Jan. 31, 2016). • China’s Straddling Bus, on a Test Run, Floats Above Streets (Buckley and Feng, <i>New York Times</i>, Aug. 4, 2016).
Sep. 1	Forecasting – Principles	Read: <ul style="list-style-type: none"> • Six Rules for Effective Forecasting (Saffo, <i>Harvard Business Review</i>, July 2007, pp. 122-131). Review: <ul style="list-style-type: none"> • Methodology Tree (from http://www.forecastingprinciples.com/index.php/methodology-tree). Turn-in: <ul style="list-style-type: none"> • Homework Assignment #1.
Sep. 6	Forecasting – Future of TV	Read: <ul style="list-style-type: none"> • Cable TV Model Not Just Unpopular But Unsustainable (Diallo, <i>Forbes</i>, Oct. 14, 2013.) • Hulu Is Said to Plan Full Cable and Broadcast Channel Streaming (Steel and Barnes, <i>New York Times</i>, May 2, 2016).
Sep. 8	Forecasting – Tools <i>Featured Technology:</i> Prediction markets	Read: <ul style="list-style-type: none"> • Why We Need to Pick Up Alvin Toffler’s Torch (Manjoo, <i>New York Times</i>, July 6, 2016). • Prediction Markets: A Practitioner’s Guide (Bingham and Nagar, Jan. 2013, available online). • OPTIONAL - Deciding How to Decide (Courtney, Lovallo, Clarke, <i>Harvard Business Review</i>, Nov. 2013, pp. 62-70). Turn-in: <ul style="list-style-type: none"> • Homework Assignment #2.

Date	Topic	Readings / Assignments
Sep. 13	Forecasting – Tools <i>Featured Technology:</i> Robots, machine learning	Read: <ul style="list-style-type: none"> • The Wisdom of (Expert) Crowds (Duboff, <i>Harvard Business Review</i>, September 2007, p. 28). • The Discipline of Business Experimentation (Thomke and Manzi, <i>Harvard Business Review</i>, Dec. 2014, pp. 70-79). Turn-in: <ul style="list-style-type: none"> • 2-3 sentence statement of the emerging technology that you will analyze for your emerging technology briefing
Sep. 15	Forecasting and Invention – Tools <i>Featured Technology:</i> Drones	Read: <ul style="list-style-type: none"> • Your Next New Best Friend Might Be a Robot (Wang, <i>Nautilus</i>, Feb. 4, 2016). • Automation Will Change Jobs More Than Kill Them (Lohr, <i>New York Times</i>, Nov. 6, 2015). • Automation Is a Job Engine, New Research Says (Lohr, <i>New York Times</i>, Dec. 3, 2015). Turn-in: <ul style="list-style-type: none"> • Homework Assignment #3.
Sep. 20	Invention, Technology Adoption, and Diffusion of Innovations <i>Featured Technology:</i> Food technology, wearable sensors, olfactory interface technology.	Read: <ul style="list-style-type: none"> • In Busy Silicon Valley, Protein Powder Is in Demand (Chen, <i>New York Times</i>, May 24, 2015). • New Synthetic Surface for Thoroughbreds Hits Pay Dirt (Finley, <i>New York Times</i>, Feb. 8, 2006). • L'Oréal Takes the Wearables War to the Beauty Counter (Friedman, <i>New York Times</i>, Jan. 6, 2016). • This \$150 Device Lets You Send Smells to Friends Through an iPhone – Like a Scented Text (Villas-Boas, <i>Tech Insider</i>, May 17, 2016). Listen to: <ul style="list-style-type: none"> • Podcast at http://www.npr.org/templates/story/story.php?storyId=6209658 Turn-in: <ul style="list-style-type: none"> • Homework Assignment #4.
Sep. 22	Guest Speaker – Astrid Fontaine, Porsche Cars North America	
Sep. 27	Technology platforms and network effects <i>Featured Technology:</i> Mobile payments	Read: <ul style="list-style-type: none"> • How to Launch Your Digital Platform (Edelman, <i>Harvard Business Review</i>, April 2015, pp. 90-97). • Comparing Mobile Wallets From Apple, Google and Samsung (Chen, <i>New York Times</i>, May 4, 2016). • OPTIONAL: Network Effects Aren't Enough (Hagiu and Rothman, <i>Harvard Business Review</i>, April 2016, pp. 65-71.) Turn-in: <ul style="list-style-type: none"> • Homework Assignment #5.

Date	Topic	Readings / Assignments
Sep. 29	Technology platforms: Reach and Holdup <i>Featured Technology:</i> Digital platforms, "Sharing" economy	Read: <ul style="list-style-type: none"> • Mastering the Intermediaries (Edelman, <i>Harvard Business Review</i>, June 2014, pp. 86-92). • Florist-Friendly Marketplaces Help Local Flower Shops Hang On (Cowley, <i>New York Times</i>, Feb. 10, 2016). • Uber's Real Challenge: Leveraging the Network Effect (Irwin, <i>New York Times</i>, June 13, 2014). • OPTIONAL: Challenge the Middlemen? (Dev and O'Connor, <i>Harvard Business Review</i>, Dec. 2015 pp. 119-123.)
Oct. 4	Platforms/Standards <i>Featured Technology:</i> Biometric authentication	Read: <ul style="list-style-type: none"> • The Plot to Kill the Password (Brandon, <i>The Verge</i>, April 15, 2014). Turn-in: <ul style="list-style-type: none"> • Homework Assignment #6. • Emerging Technology Briefing.
Oct. 6	Standards and Modularity <i>Featured Technology:</i> Smart homes, the Internet of Things, modular smart phones	Read: <ul style="list-style-type: none"> • Thread, ZigBee, Z-Wave: Why smart home standards matter (Sung, <i>Wearable</i>, May 12, 2016). • Inside Project Ara, Google's Lego-like plan to disrupt the smartphone (Hollister, <i>CNET</i>, May 22, 2016). * watch the video at https://www.youtube.com/watch?v=intua_p4kE0.
Oct. 11	NO CLASS – Fall Break	
Oct. 13	Standards and Infrastructure <i>Featured Technology:</i> Crypto-currencies (e.g., Bitcoin) and blockchain systems	Read: <ul style="list-style-type: none"> • Live Streaming Breaks Through, and Cable News Has Much to Fear (Manjoo, <i>New York Times</i>, July 13, 2016). • Bitcoin Basics (Popper, <i>New York Times</i>, Nov. 4, 2015). • Envisioning Bitcoin's Technology at the Heart of Global Finance (Popper, <i>New York Times</i>, Aug. 12, 2016). Turn-in: <ul style="list-style-type: none"> • Homework Assignment #7. • Homework Assignment #8.
Oct. 18	Mid-Term Exam	
Oct. 20	Infrastructure and Stakeholder Impact <i>Featured Technology:</i> Electric cars, Hydrogen cars	Watch: <ul style="list-style-type: none"> • Documentary: Who Killed the Electric Car Read: <ul style="list-style-type: none"> • G.M., in a First, Will Sell a Car Designed for Electric Power This Fall (Fisher, <i>New York Times</i>, Jan. 5, 1996.) Turn-in: <ul style="list-style-type: none"> • Homework Assignment #9.

Date	Topic	Readings / Assignments
Oct. 25	Infrastructure and Stakeholder Impact <i>Featured Technology:</i> Charging / Refueling infrastructure	Read: <ul style="list-style-type: none"> • Water Out of the Tailpipe: A New Class of Electric Car Gains Traction (Boudette, <i>New York Times</i>, July 21, 2016). • Here's How Electric Cars Will Cause the Next Oil Crisis (Randall, <i>Bloomberg</i>, Feb. 25, 2016) * Watch the accompanying video. Turn-in: <ul style="list-style-type: none"> • One paragraph statement re: your Report from the Future. This paragraph should include the process on which you have chosen to focus, the objective of that process, and at least two steps involved in that process.
Oct. 27	Guest Speaker – Sean Banks, TTV Capital	
Nov. 1	Stakeholder Impact, Legal, and Regulatory <i>Featured Technology:</i> Autonomous vehicles	Read: <ul style="list-style-type: none"> • Introduction (Lessig, <i>Free Culture</i>, pp 1-7). • Uber Aims for an Edge in the Race for a Self-Driving Future (Vlasic and Isaac, <i>New York Times</i>, Aug. 18, 2016). • Self-Driving Cars May Get Here Before We're Ready (Abrams, <i>New York Times</i>, Jan. 21, 2016). • Silicon Valley-Driven Hype for Self-Driving Cars (Gomes, <i>New York Times</i>, July 9, 2016). • OPTIONAL: 5 Things That Give Self-Driving Cars Headaches (Boudette, <i>New York Times</i>, June 4, 2016).
Nov. 3	Sustainability, Legal, and Regulatory <i>Featured Technology:</i> "Clean energy": solar, geothermal, fusion	Watch: <ul style="list-style-type: none"> • Top 10 Energy Sources of the Future (The Daily Conversation, https://www.youtube.com/watch?v=uStFvcz9Or4). Read: <ul style="list-style-type: none"> • A Skeptic Looks at Alternative Energy (Smil, <i>IEEE Spectrum</i>, July 2012.) Complete: <ul style="list-style-type: none"> • Homework Assignment #10. Turn-in: <ul style="list-style-type: none"> • A high-level summary of 3 key developments in the 2016-2026 time period for your Report from the Future.
Nov. 8	Sustainability, Legal, and Regulatory <i>Featured Technology:</i> Carbon capture and storage	Read: <ul style="list-style-type: none"> • Earth: The Sequel The Race to Reinvent Energy and Stop Global Warming (Krupp and Horn, pp. 3-13.) • Pollution Economics (Forrister and Bledsoe, <i>New York Times</i>, Aug. 9, 2013.) • Iceland Carbon Dioxide Storage Project Locks Away Gas, and Fast (Fountain, <i>New York Times</i>, June 9, 2016). * watch the video. • Taking Carbon from Air (Martin, <i>Technology Review</i>, Jan. 2016).
Nov. 10	Guest Speaker - TBD	

Date	Topic	Readings / Assignments
Nov. 15	Legal and Regulatory <i>Featured Technology:</i> “Sharing” economy	Read: <ul style="list-style-type: none"> • Spontaneous Deregulation (Edelman and Geradin, <i>Harvard Business Review</i>, Apr. 2016). • Airbnb in Disputes With New York and San Francisco (Benner, <i>New York Times</i>, June 28, 2016). • The Pros and Cons of Sharing (Giridharadas, <i>New York Times</i>, June 23, 2014.)
Nov. 17	Ethical and Normative considerations <i>Featured Technology:</i> Human augmentation and DNA editing	Read: <ul style="list-style-type: none"> • The Extinction Invention (Regalado, <i>Technology Review</i>, May 2016, pp. 54-59). • Gene-Edited Dogs (Regalado, <i>Technology Review</i>, Jan. 2016, p. 18). • How Science Can Build a Better You (Duncan, <i>New York Times</i>, Nov. 3, 2012.) Turn-in: <ul style="list-style-type: none"> • Homework Assignment #11
Nov. 22	Ethical and Normative considerations <i>Featured Technology:</i> Personalized medicine	Read: <ul style="list-style-type: none"> • Scientists Seek Moratorium on Edits to Human Genome That Could Be Inherited (Wade, <i>New York Times</i>, Dec. 3, 2015). • 23andMe (Regalado, <i>Technology Review</i>, July 2016, pp. 68-69). Turn-in: <ul style="list-style-type: none"> • Report from the Future
Nov. 24	No Class – Thanksgiving	
Nov. 29	Report from the Future Presentations	
Dec. 1	Report from the Future Presentations	
Dec. 6	Course Wrap-Up	
Dec. 8	Final Exam – 2:50 to 5:40 p.m.	